REMARKS

In the Office Action, claims 1, 3, 9, and 16-20 are rejected under 35 U.S.C. §102; and claims 2, 4, 5-8 and 10-15 are rejected under 35 U.S.C. §103. Claims 1-16 and 20 have been amended. Applicants believe that the rejections have been overcome and/or are improper in view of the amendments and for the reasons set forth below.

In the Office Action, claims 1, 3, 9, and 16-19 are rejected under 35 U.S.C. §102 in view of Kondo et al., Optic Letters Vol. 24, No. 10, pp. 646-648 ("Kondo"). The claims are directed to a method for manufacturing a planar lightwave circuit device such as an optical coupler/splitter and method for optical characteristics of a planar lightwave circuit device that includes, in part, a waveguide core that connects a plurality of light input ports or light input ports inside a plate shaped cladding layer which is formed from a glass. Further, these claims require, in part, that the waveguide core is formed by focusing a laser beam onto the cladding layer, and optical characteristics such as a branching ratio and the like of the planar lightwave circuit device are adjusted by adjusting the refractive index of at least one portion (i.e., a refractive index adjustment area) of the waveguide core by adjusting an irradiation amount of the focused laser beam. In the planar lightwave circuit device as claimed, wavelength dependence can be suppressed as small as possible.

In contrast, the Kondo discloses a fabrication of a long-period optical fiber grating by focusing a femto-second laser. The long-period optical fiber grating is provided by changing the refractive index of a part of a core which is positioned in the center of a single mode optical fiber having an input end and an output end to form a grating for laying wavelength dependence onto the transmission characteristic and the reflection characteristic of the signal which is outputted at the output end. Therefore, the planar lightwave circuit device as claimed and the long-period optical fiber grating are different in their structure and functions based on at least these reasons.

Further, the refractive index adjustment area of the present application is not the grating but is provided for adjusting the branching ratio of the waveguide core. Moreover, although the refractive index of the core which is previously formed in the optical fiber can be changed as disclosed in Kondo, the waveguide core cannot be newly formed in the cladding layer in contrast to the claimed invention.

Based on at least these reasons, Applicants believe that Kondo fails to disclose the claimed invention. Accordingly, Applicants respectfully request that the anticipation rejection of claims 1, 3, 9 and 16-19 be withdrawn.

In the Office Action , claims 5-8 and 10-15 are rejected under 35 U.S.C.§103 in view of U.S. Patent No. 5,978,538 ("Miura I") in view of Japanese Patent Publication No. JP07-063936 ("Yoshimura") and Miura, K. et al., "Photo written optical waveguides in various glasses with ultrashort pulse lasers" Applied Physics letter, Vol. 71, No. 20, December 8, 1997, pp. 3329-3331 ("Miura II"). Applicants believe that this rejection has been overcome in view of the amendments and for the reasons set forth below.

The claims at issue are directed to a method for manufacturing a planar lightwave circuit device such as an optical coupler/splitter that includes, in part, a waveguide core which connects a plurality of light input ports or light input ports inside a plate shaped cladding layer which is formed from a glass. Further, these claims, recite, in part, the waveguide core is formed by focusing a laser beam onto the cladding layer, and optical characteristics such as a branching ratio and the like of the planar lightwave circuit device are arbitrarily adjusted by scanning the laser beam onto the waveguide core and by changing the number of the scanning.

In contrast, the Miura I reference discloses a formation of the waveguide core in the glass material and an adjustment of the refractive index of the waveguide core by focusing the femto-second laser. Further, Yohsimura discloses an adjustment of the refractive index of the optical coupler/splitter which is formed from a resin by focusing ultraviolet rays. In addition, the Miura II discloses a formation of the waveguide core in a variety of glass materials by focusing a laser beam.

However, the features that the waveguide core is formed by focusing the laser beam onto the cladding layer which is formed from the glass, and the optical characteristics of the planar lightwave circuit device arbitrarily adjusted by scanning the laser beam onto the waveguide core and by changing the number of the scanning as claimed are not disclosed or suggested in the cited art even if combinable. In this regard, the additional scanning of the laser beam onto the waveguide core which is formed by focusing the laser beam onto the cladding layer are not provided in Miura I and Yohsimura.

Further, Yohsimura is merely relied on for purportedly adjusting the refractive index of the waveguide core which is previously formed in the optical coupler/splitter which is formed from a resin, and thus the new forming of the waveguide core in the cladding layer which is formed from a glass as claimed is not disclosed or suggested by Yoshimura. In addition, the irradiation of the ultraviolet rays of Yoshimura is not provided for obtaining the arbitrary optical characteristics of the planar lightwave circuit device but is relied on for correcting a random error of the refractive index of the waveguide core. In Yoshimura, since the ultraviolet rays has relatively low power and low accuracy of the focused light compared with the laser beam, although the refractive index can be slightly changed to the extent that the random error of the refractive index can be corrected, the optical characteristics of the planar lightwave circuit device which is formed from the glass cannot be arbitrarily adjusted in contrast to the claimed invention. Therefore, the cited art, even if combinable, are distinguishable from the features that the waveguide core is formed by focusing a laser beam onto the cladding layer which is formed from the glass, and the optical characteristics of the planar lightwave circuit device arbitrarily adjusted by scanning the laser beam onto the waveguide core and by changing the number of the scannings as claimed.

Based on at least these reasons, Applicants believe that the cited art fails to disclose or suggest from the claimed invention. Therefore, Applicants respectfully submit that the cited art even if combinable fails to render obvious the claimed invention.

Accordingly, Applicants respectfully request that the obviousness rejection with respect to claims 5-8 and 10-15 be withdrawn.

In the Office Action, claims 2 and 4 are rejected under 35 U.S.C. § 103 in view of Kondo and Miura I (i.e., US 5,978,538). Applicants believe that this rejection has been overcome based on at least substantially the same reasons as discussed above. In this regard, claims 2 and 4 depend from claims 1 and 3, respectively. Therefore, Applicants believe that Kondo and Miura I even if combinable are distinguishable from claims 2 and 4 and thus fail to render obvious the claimed invention.

Accordingly, Applicants respectfully request that the obviousness rejection of claims 2 and 4 be withdrawn.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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